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ABSTRACT

During the 1990s, school programs that more explicitly link school and work have been expanded. In order to realize the curricular and pedagogical reforms that underlie these programs, teachers need appropriate staff development. In 1996, RAND staff designed and pilot-tested a 6-week "mini-sabbatical," a prototype course to help teachers in a variety of settings learn how to make the kinds of curricular and pedagogical changes implied by school-to-career reforms. This paper describes the conceptual framework for the design of the mini-sabbatical and findings from assessment of the pilot project. The sabbatical's instructional activities are based on the concepts of adult learning and constructivist learning. The pilot experience showed that: (1) teachers need more assistance in developing assessments; (2) teachers had difficulty relinquishing control over learning; (3) teacher collaboration is an important catalyst for learning; (4) the reflective practitioner needs support through group collaboration; (5) industry experience is not sufficient for developing work-related curricula; and (6) teaching is not always planned. Four tables are included. (Contains 21 references). (LMI)

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Designing Classrooms that Work: Conception and Pilot Study

Cathleen Stasz

DRU-1671-NCRVE/UCB

July 1997

Prepared for National Center for Research in Vocational Education, University of California Berkeley

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PREFACE

During the 1990s, educators and employers have been reconceptualizing the relationship between education and work. As a result, school programs that more explicitly link school and work have been expanded and developed, and many are supported by federal funds through the School-to-Work Opportunities Act of 1994. In order to realize the curriculum and pedagogical reforms that underlie these programs, teachers need appropriate staff development.

In 1996, RAND staff designed and pilot-tested a six-week "mini-sabbatical," "Designing Classrooms that Work." The mini-sabbatical was developed as a prototype course to help teachers learn how to make the kinds of curricular and pedagogical changes implied by school-to-career reforms, whether they work in career academies, cooperative education, school-based enterprises, or other types of programs.

This report presents the conceptual framework for the design of the mini-sabbatical and findings from our assessment of the pilot project. A companion report presents the mini-sabbatical curriculum: "Designing Classrooms that Work: Teacher Training Guide" MDS-963. Berkeley: CA: National Center for Research in Vocational Education, 1997. Both of these documents should be of interested to educators or employers engaged in school-to-career programs and to curriculum developers and teacher trainers in district and state education offices or at universities.

Development and testing of the mini-sabbatical at RAND was funded by the National Center for Research in Vocational Education, University of California, Berkeley, from a grant provided by the U.S. Department of Education, Office of Adult and Vocational Education.

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ACKNOWLEDGMENTS

This project depended on the skills and dedication of many individuals. First and foremost, the project greatly benefited from the enthusiasm of seven teachers and one teacher trainer who agreed to participate in the mini-sabbatical pilot test in Summer 1996. Since they participated in the research project under conditions of confidentiality, we can not thank them by name. The collaboration between the teachers and the RAND team was essential to the success of the project, and we can not thank them enough for their willingness to work hard, explore new ideas and teaching practices, and support each other in the process.

The classroom teaching portion of the mini-sabbatical was conducted at Woodrow Wilson High School in Los Angeles. We thank Ina Roth, principal, and her staff for providing the facilities and helping to recruit student participants.

Kim Ramsey and Cathy Stasz co-directed the project. Kim Ramsey was the lead trainer for the mini-sabbatical course. Tor Ormseth and Jennifer Co, research assistants, were responsible for all the logistics of conducting the mini-sabbatical. Tor Ormseth, and RAND researchers Rick Eden and Brian Stecher, contributed to the curriculum development and training. David Adamson, RAND communications analyst, organized the mini-sabbatical materials into a coherent whole. Donna White prepared the manuscripts and provided her always able assistance throughout.

We dedicate this project to the late Charles S. Benson, director of the National Center for Research in Vocational Education from 1988-1993. His vision for education continues to inspire us.

INTRODUCTION

Almost universally, America's teachers have been trained to teach curricula that are school-based and subject-specific. But federal legislation and school reformers are urging that teachers develop and teach curricula that focus on "generic" skills, such as problem solving and teamwork, integrate vocational and academic education, and emphasize "real-world" applications, especially applications found in the workplace. Unfortunately, most teachers are being asked to change their practice without the requisite knowledge or the means for acquiring it. To make use of the workplace as a context for learning, teachers need: (1) knowledge of work and work practice; (2) an appropriate model for classroom design and instruction; and (3) the opportunity to learn and apply both.

In response to this need, and as a follow-on to our earlier research, we developed a six-week "mini-sabbatical" for high school teachers and teacher trainers to help teachers make the kinds of curriculum and pedagogical changes discussed above. The mini-sabbatical activities included classroom instruction, worksite observation, curriculum design, and teaching a small group of students. The process, or instructional activities that comprise the mini-sabbatical, was designed to reflect conceptions of adult learning and constructivist learning. Key features of the content include a model of classroom design, including developing appropriate assessments, and knowledge about work practice and action research. The mini-sabbatical is intended for high school teachers in a variety of programs that aim to connect school and work, whether they teach in career academies, cooperative education, school-based enterprises, career focus schools, or other program types.

This paper reports on the design and pilot test of the mini-sabbatical. It begins with a brief background discussion, then reviews the principles and assumptions about learning on which the mini-sabbatical design rests. It presents the goals the mini-sabbatical aims to achieve, then briefly outlines the six-week mini-sabbatical activities. The complete mini-sabbatical curriculum is found in a companion *Teacher Training*

Guide.[1] The paper then sets forth a justification for the goals of the mini-sabbatical. Finally, it describes our assessment of the mini-sabbatical pilot test, conducted in summer 1996.

BACKGROUND

Encouraged by federal legislation, many states and localities are developing new school-to-career (STC) programs and systems. The impetus for STC reforms comes from different sources, including concerns about youth preparation for a workplace that is changing dramatically in response to new technology and a competitive business environment and a poor record of transition from school-to-career for many youth (Stasz, Kaganoff, and Eden, 1994; Stasz, 1995; Stern, Finkelstein, Stone, Latting, and Dornsife, 1995).

STC reforms encompass a wide variety of programs and serve students in high schools, non-baccalaureate post secondary institutions, or out-of-school youth. While some programs explicitly prepare students for work, others have an industry focus to motivate students, contextualize learning, or provide a broad introduction to industry-related career opportunities. The kinds of programs under the STC rubric include cooperative education, school-based enterprise, tech-prep, career academies, and youth apprenticeships. While there is much variety within and between program types, STC programs, by and large, share three common elements: (1) integration of school-based and work-based learning; (2) combined academic and vocational curriculum and (3) linking of secondary and post secondary education (Stern et al., 1995). Creating programs which include these elements often requires sweeping changes in curriculum, methods of instruction, and relations between schools and other organizations including employers and institutions of higher education.

STC programs can impact participating teachers in many important ways, but perhaps most significantly when they require changes in curriculum and teaching. STC's success depends on teachers' ability to develop new curricula and design classrooms to

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[1]Ramsey, K., Stasz, C., Ormseth, T., Eden, R., and Co, J. (1997). *Designing Classrooms that Work: Teacher Training Guide*, MDS-963, Berkeley, CA: National Center for Research in Vocational Education, University of California.

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promote active learning in students. Developing integrated curricula also often depends on collaboration between academic and vocational teachers who each bring needed expertise to the curriculum design task. But most high school teachers are not well prepared to change curriculum or practice or to collaborate across disciplines in ways that support STC reforms (Bodilly, Ramsey, Stasz, and Eden, 1993; Grubb et al., 1992; Stasz, Ramsey, Eden, DaVanzo, Farris, and Lewis, 1993; Stasz et al., 1994).

LEARNING PRINCIPLES AND ASSUMPTIONS

New models of how adults and students learn have emerged from recent education research. Two models—adult learning and constructivist learning—form the conceptual basis for the design of the mini-sabbatical as a learning process.

Adult Learning Model

The design of the mini-sabbatical teacher activities adopts an adult learning model. Serious research and inquiry on adult education and adult learning began when changes in the social landscape called into question widely held assumptions about appropriate educational approaches used to implement the social and work preparation aims of education and training. Before the 1960s, education for adults and children was based on "faith" that if educators pour enough knowledge into people they will turn out to be good people and will know how to make use of knowledge. Revolutions in knowledge, technology, and social policies for equality of education and employment opportunities altered American life and fostered new expectations for education and training to facilitate development of self-direction (cf. Knowles, 1980; Rivera, 1987; Halpern et al., 1994).

Responding to these changes, education theorists and educators began developing and popularizing approaches that would produce people who are able to apply knowledge under changing conditions and who engage in lifelong and self-directed learning.[2] This

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[2]Several well-known volumes are now available and widely used by adult educators and trainers: the defining perspectives of the field was introduced in *The Modern Practice of Adult Education: From Pedagogy to Andragogy* by Malcolm Knowles in 1980; and Philip Candy's book *Self-direction for Lifelong Learning* (1991) reflects a decade of development and research in the field and surfaces its deep

shift in assumptions motivated, within the adult classroom, a change in focus from teaching to learning. Several new definitions emerged from the work of theorists and practitioners which together define three key components of adult education: development of self-direction and inquiry skills; the role of the adult educator as facilitator; and new classroom practice (Knowles, 1980; Brady, 1986; Candy, 1992.).

Self-direction and Inquiry. Self-direction and inquiry skills are needed to help individuals and society cope with the demands of change. The methods and techniques of adult education emphasize learner control and helping individuals adopt the attitude that learning is a lifelong process. Adult education classrooms emphasize critical judgment, autonomous action, and self-initiated inquiry (Candy, 1991). Adult educators measure success by the extent to which participants leave a given learning experience with heightened curiosity and increased inquiry skills so as to carry on their own learning. Inquiry skills prepare adults to participate in a changing society (Cervero, 1991).

Role of the Adult Educator. Given the goals of adult learning, those who work face to face with adults need to accept the role of facilitator. Moreover, self-direction and inquiry goals suggest that several activities have priority. Adult educators help learners diagnose their particular learning needs and then plan a sequence of experiences likely to produce the desired learning. Creating conditions and providing resources that will motivate learning and then making available a range of effective methods and techniques are also key. Finally, adult educators help learners evaluate outcomes of their learning experience.

New Classroom Practice. The adult learning model is based on the notion of andragogy—literally "man-teaching"—as opposed to pedagogy or "child-teaching" (Knowles, 1980; Fowler, 1986). The andragogy model assumes that as individuals mature they: (1) increasingly see themselves as self-directed persons; (2) accumulate a reservoir of experiences that become a rich resource and support for learning; (3) are

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connection to constructivism. In addition, several volumes focus on the role and experience of adult learners exposed to learning environments arranged around the assumptions of adult education and learning; they include *The Art of Learning: A Self-Help Manual for Students*(1992) by Katherine M. Ramsland and *Perspectives on Adult Learning* (1986), edited by E. Michael Brady.

motivated to learn as they become aware of the developmental requirements of their social roles; and (4) increasingly value immediacy of application and performance over postponement of application and subject-centerness.

A comparison of the assumptions between andragogy or adult learning theory and more traditional pedagogy suggests clear differences with respect to educator's concept of the learner, the role of experience in shaping learning, motivation to learn, and the learner's orientation to learning.

> Traditional pedagogy views the learners as dependent and the teacher as responsible for what gets learned. Andragogy sees learners moving from dependency to self-directedness, with the teacher nurturing this process.
>
> For pedagogy, experience is a starting point for teachers to expand. For andragogy, learners begin with a rich experience base and learn best from experiential techniques, such as experiments and simulations.
>
> Learners have different motivations. Children can accept what others deem important and can benefit from a step-by-step curriculum. Adults are motivated when learning applies to real-life problems or tasks.
>
> Child learners accept that the knowledge they need is subject-specific and will be applicable at some later point. Adult learners want to increase and demonstrate competence.

In practice, andragogy and traditional pedagogy models are not treated as dichotomous opposites, but rather are most useful when their assumptions are seen as two ends of a spectrum (Knowles, 1980). Assessing the learner's dependency in a given situation must be determined before deciding whether to *lean* toward pedagogy or andragogy assumptions in designing and facilitating learning experiences. Often adult learners are not immediately prepared to take on independence and self-direction, but will make the shift given time and patience. In some cases, the amount of unlearning that must take place is tremendous. Teaching a classroom of adults is difficult because it requires constant adaptation of the two models (Frager, 1986).

Constructivist View of Learning

Recent research on learning—the approach to learning that we hope the teachers will adopt for their students—posits a *constructivist* view of learning. The constructivist view in education, stemming from the work of Piaget, Dewey and Vygotsky, and others, argues that the goal of education is to help students construct their own understandings. Knowledge is the result of a learner's activity, not the passive reception of information or

instruction (Phillips, 1995). Construction of knowledge is both individual and social—it can result from individual mental activity or from interaction in social settings which includes other individuals, physical and symbolic objects, and so on.

A constructivist approach leads to an emphasis on learning rather than teaching and on creating facilitative environments that support learning (Collins, in press). The teacher's task is to create communities of discourse that allow students to discuss big ideas—such as the author's point of view in a literary work—and to apply or "test out" the value of the idea for themselves or its usefulness for explaining important phenomena (Prawat, 1995). Instructional theories based on a constructivist view of learning provide practical guidance for teachers' practice. In its essential points, the adult learning model described above is fully compatible with a constructivist approach.

Implications for Design

The adult learning and constructivist perspectives have several important design implications for the mini-sabbatical, which we attempted to incorporate. First, the constructivist view of learning is embedded in the content of the mini-sabbatical in two respects. It is part of the learning content for teachers, since we want them to think of student learning in this light. Second, because teachers are also learners in the mini-sabbatical context, the course is designed to engage teachers in a learning community and to give them the opportunity to actually try out the curriculum units they design.

Because teachers came into the mini-sabbatical with an experience base that is largely unknown, we did not know what any individual teacher needed to know and do in order to change his or her classroom practice. However, we wanted teacher participants to seriously call into question their current model of practice. Thus, the mini-sabbatical process needed to facilitate teachers' reflecting on personal practice and exploring the new approaches. We incorporated several facilitation processes in the mini-sabbatical, including journal writing, frequent discussion and exchange among peers, videotaping of classroom lessons with replay feedback, and presentations to the group. The curriculum also introduced teachers to the concept of action research, to give them a framework for evaluating their own performance and teaching practice.

A third implication for design is the need to provide resources and supports for self-directed inquiry. Because learning is both individually and socially constructed, the learning environment provides important resources for learning. A good design will link

learners with necessary resources. Thus, we designed the mini-sabbatical to link teacher participants with workplaces and workers as sources of knowledge about real-world work contexts. Even if teachers continue to make use of traditional teaching methods, the *content of instruction* will be more authentic if they learn how to assess and make use of non-traditional sources, such as the workplace, to inform and supplement curricula and teaching in classrooms.

THE GOALS OF THE MINI-SABBATICAL

The goal of the mini-sabbatical is to design a curriculum whereby teachers, as adult learners, can acquire skills and behaviors that will:

(i) increase their knowledge of work practice and the authentic applications of domain knowledge in work;

(ii) help them create high-quality, integrated curricula that incorporates domain-specific and generic skills;

(iii) help them design classrooms that promote authentic learning;

(iv) help them develop student assessments that provide meaningful feedback to students and the teacher.

As discussed above, the mini-sabbatical employs an adult learning model and a six-week-long course of activities. The course includes a number of activities each week.

The goals of the mini-sabbatical represent content areas that teachers will be exposed to and given the opportunity to practice by actually designing and teaching a short course with high school students. The mini-sabbatical will also give teachers the tools they need to enter the company of experts in the workplace, become learners, and then translate work practice into curriculum and classroom designs.

In addition to work knowledge, teachers may also need an instructional design model that supports a constructivist view of learning and guidance on how to put the model to practice. The mini-sabbatical proposes to give teachers the tools they need to gain knowledge that is necessary for defining curriculum and instruction in many STC programs. Put another way, it intends to help teachers answer three questions: What to teach? How to teach it? How to assess what students learn?

In the following sections we provide conceptual background that sets forth a justification for each of the four subgoals listed above.

Goal 1: Increase Teacher Knowledge of Work Practice

In STC reforms, unlike other school reform proposals, work and occupations take center stage. In some cases, the occupational area defines course or program content, as, for example, in apprenticeship programs which prepare students for work in a particular industry. In other cases, the occupational area provides a focused context for learning—a source of meaningful examples which illustrate the application of knowledge in use, as in many career academies. In both cases, however, teachers require knowledge of the occupational area in addition to knowledge of their discipline.

Academic teacher training, however, typically follows a baccalaureate model, which emphasizes subject-matter preparation with the addition of courses in traditional teaching methods. Once in school, teachers are often assigned to subject-specific departments, an organizational structure which can hamper interdisciplinary collaboration. A century of tradition separates academic from vocational teachers and students in most comprehensive high schools. Staff development programs are few, of short duration, and do not normally give teachers the opportunity to come in contact with the world of work outside the schoolhouse (Stasz et. al., 1993; AFT, 1997).

A core idea behind the mini-sabbatical is that teachers need deeper knowledge of work and work practice to make use of the occupation or industry as a context for (or sometimes object of) learning. The challenge is to develop a way for teachers to acquire the knowledge they need—short of becoming working practitioners in the occupation.

Goal 2: Create High-Quality, Integrated Curricula

Many reformers believe that combining academic and vocational curriculum will result in more effective instruction for a broad range of students. Integration is intended to expand curriculum content in ways that bridge the academic and vocational knowledge and skills found in an occupational area. High-quality, integrated curricula can have the following characteristics. It can: (a) enhance the academic content of vocational courses; (b) show the application of abstract disciplinary knowledge or concepts in work; (c) aim for broad understanding of an industry, not narrow job skills; (d) link courses in coherent

sequences; and (e) incorporate instruction, to the extent possible, in all aspects of an industry.

Although there have been few evaluations of programs that incorporate integrated curriculum, the available evidence suggests that programs embracing an occupational focus, such as career academies and occupationally-oriented high schools, can raise academic learning, reduce dropout rates, and instill positive career-related aspirations for students enrolled (Stasz, Kaganoff, and Eden, 1994). These programs include a sequence of courses, not just small changes within the vocational curriculum, for example the adoption of off-the-shelf "applied academics" curricula. Although a stand-alone course can have some characteristics of high-quality integration, it can only be a building block in a more coherent integrated curriculum (just as algebra is only one course in a coherent mathematics sequence).

Goal 3: Classroom Designs that Promote Authentic Learning

What kind of pedagogy supports constructivism? Generally speaking, constructivist teaching is progressive—it favors an activity-oriented, student-centered approach to schooling and moves the focus away from the teacher to the student. In contrast, a more conservative, traditional pedagogy would emphasize teacher behaviors for transmitting knowledge and skills in a clear, well-structured, and efficient manner (Collins, in press; Prawat, 1995).

A constructivist approach, however, is more than project-based instruction. Dewey, for example, whose work on activity-based learning is the basis for many contemporary approaches, specified several characteristics for the design of effective learning activities. In his view, projects should be guided, not left entirely to students; concepts should be taught in an applied manner; and projects should be motivated by the content of what is to be learned (Prawat, 1995).

Recent research supports the value of constructivist teaching approaches. One framework, referred to as "cognitive apprenticeship," builds on educational philosophers like Dewey, but also relies on traditional apprenticeship approaches to teaching (Collins, Brown, and Newman, 1989; Collins, Brown, and Holum, 1991). This framework supports the design of *authentic* learning environments. To create an authentic environment, teachers must know the potential uses of the knowledge to be taught and how to design instructional activities that reflect those possible uses (Collins, in press).

The cognitive apprenticeship approach emphasizes teaching and learning in context, in ways that help students later apply school learning to other tasks. It also emphasizes the development of thinking and problem solving and stresses the importance of techniques to make thinking processes visible.

The framework describes four dimensions: content, method, sequence, and sociology (Collins et al., 1989; 1991). Each dimension has a set of characteristics relevant to constructing or evaluating learning environments. A consideration of these characteristics should help teachers make conscious decisions about instruction, which is preferable to making unconscious choices. This framework is especially useful for designing learning environments that advance STC program goals because it is based on studies of expert practice and how novices or newcomers develop expertise in a discipline. Reviews of cognitive apprenticeship in practice indicate that it promises to be an effective strategy for supporting student learning (Berryman and Bailey, 1992; Stasz et al., 1993).

Newman, Secada, and Wehlage (1995) outline another, complementary way to promote authentic learning. They draw on significant adult accomplishments to define standards to assess the intellectual quality of student achievement, and the instructional approaches and assessments to promote achievement. They define standards for three criteria: construction of knowledge, disciplined inquiry, and value beyond school. The standards—which they call "authentic pedagogy"—emphasize teaching that requires students to think, to develop in-depth understanding, and to apply academic learning to important, realistic problems. In a study of 24 schools, authentic pedagogy raised student achievement equitably for students of all social backgrounds (Newman and Wehlage, 1995).

Goal 4: Develop Alternative Assessments

The final goal of the mini-sabbatical is to help teachers develop assessments that reflect diverse learning goals and provide meaningful feedback to teachers and students. Popular forms of assessment test students' knowledge of facts, concepts, and processes in a domain. They rarely assess students' ability to solve problems, reason, cooperate with others, or demonstrate other skills and capabilities learned in situated learning environments. They also do not help teachers and students diagnose learning successes

and failures in ways that help modify and improve on the learning process (Stasz et al., 1993).

In addition to a general need for valid, reliable, and affordable methods for assessing skills, teachers need a systematic approach for choosing among assessment methods for their particular needs. One such approach, which we adopted for the mini-sabbatical, guides teachers through the following steps:[3]

1. Clearly define the purpose of the assessment;
2. Determine the knowledge and skills to be measured;
3. Select assessment strategies that best measure those skills and knowledge;
4. Check the quality of the strategies to be implemented; and
5. Make sure each strategy is feasible to implement.

Different types of assessments strategies are used for different purposes, and these purposes determine how to measure knowledge and skills. A paper and pencil test is most appropriate, for example, for assessing students' knowledge of mathematical or history facts. In contrast, a performance event, such as a group-led experiment or problem-solving exercise is a more fitting strategy for assessing a student's ability to think and solve problems as a member of a team. Purposes might include measuring individual student learning, certifying mastery of material, or providing information about program quality.

Written tests are popular types of assessments, including multiple-choice or open-ended items, essays, and problem- or scenario-based items. A second type, performance tasks, may consist of one or a set of multiple physical tasks, such as giving a speech or changing the oil in a car engine. Senior projects include at least three discrete activities to measure a student's achievement over the course of a school year: (1) a research

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[3]Assessment principles are drawn from a current project for NCRVE, "Which Alternative Assessments Hold Promise for Vocational Education." Brian Stecher, one of the project leaders, participated as an instructor in the mini-sabbatical. Mini-sabbatical curriculum materials were drawn from Stecher et al. (1997).

paper; (2) a project (the product is usually not written, but an artifact of some kind, such as a video, a performance, or a physical model); and (3) an oral presentation. Recently, portfolio assessments have gained attention as a way to collect student work that represents multiple outcomes and activities.

To ensure that an assessment strategy will provide accurate information, the technical quality of the measures must be considered. Three aspects of quality are of particular concern: (1) reliability: how accurate is the information?; (2) validity: does the assessment measure what it is intended to measure?; (3) fairness: is the assessment free of biases against any group of students? Higher reliability, or degree of accuracy of an assessment, enhances fairness.

Finally, a teacher must consider a number of practical issues. Is the assessment feasible in terms of the cost and time required to administer and score? Alternative assessments, like performances or portfolios, are more expensive to develop, administer and score than selected-response tests. However, developing alternative assessments may also have two benefits: substantial staff development and greater test validity. Alternative assessments also place greater time demands on administrators, teachers, and students. Complexity is also an issue. Since alternative assessments are often more complex than traditional tests because they can require special training to administer and score them or special materials (e.g., manipulatives). A final issue is acceptability. People familiar with traditional paper-and-pencil tests may be reluctant to administer alternative assessments or to accept the test results as credible.

THE MINI-SABBATICAL PILOT TEST AND ASSESSMENT

During the summer of 1996, we implemented the mini-sabbatical as a pilot test.[4] The purpose of the pilot study was to assess the feasibility of implementing the six-week mini-sabbatical and to determine whether the curriculum and process would achieve the goals discussed above. In this section we review the design of the pilot study and report on the findings from our assessment.

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[4]The mini-sabbatical *Teaching Training Guide* provides details for implementing the mini-sabbatical.

Overall, we determined that the implementation is feasible, although somewhat time-consuming to organize, and that teachers were able to learn key concepts and incorporate them into the design and delivery of their curriculum units. The teacher participants were highly enthusiastic about the value of the mini-sabbatical with respect to the knowledge they gained as well as a vehicle for changing practice. Most participating teachers showed and expressed fairly substantial changes over the course of the mini-sabbatical that appeared to continue when they returned to their home school.

Participants and Weekly Schedule

For the pilot study, we recruited seven teachers and one teacher-trainer as participants from four schools in the Los Angeles area. The participants, five men and three women, had diverse experience and backgrounds (see Table 1).

Two male teachers taught math and technology, respectively, in a career academy with a transportation industry focus (teachers 1 and 2). Both were relatively new to teaching, and one came to teaching with a background in engineering and architectural drafting. Teachers 3, 4, and 5 (two men and one woman) also taught in a transportation industry-related career academy that was part of the same program, but at a different school. All three teachers had prior work experience in areas related to their main teaching discipline. Students enrolled in these academies had various opportunities to learn about the transportation industry throughout the school year; juniors and seniors had opportunities for paid summer employment in transportation-related jobs.

Teachers 6 and 7, a male and a female, taught at a medical magnet high school where students spent one-half day per week as interns in various medical settings. The final participant, a teacher trainer, was responsible for curriculum and staff development at a new math, science, and technology magnet high school. Previously, she had taught life sciences for ten years. None of these teachers had industry experience.

As part of the recruitment process, teacher candidates completed a background survey, including education and credentials, typical practices, preferred ways of working within the educational system (e.g., level of comfort with cross-curricular planning) and desired work assignment. Teachers also submitted a work sample—a project or instructional unit designed by the teachers that they found engaging to students. The results of the survey, the work sample, and a personal interview determined a candidate's eligibility.

Selected teachers were paid an honorarium of $3,000 to participate in the six-week mini-sabbatical pilot. The first four weeks were spent in class at RAND or conducting work observations at assigned worksites. The last two weeks were held at a local high school, where teachers taught their curriculum unit to a small group of

Table 1

CHARACTERISTICS OF PARTICIPATING TEACHERS

Main Subject Taught	School Program	Teaching Credential	Years Teaching Experience	Relevant Industry Experience
Algebra AB, Intro to Computers	Transportation Career Academy 1	Mathematics	4	No
CAD/ Technology	Transportation Career Academy 1	CAD, Mechanical drafting	3	Yes
Mathematics, Computer Science	Transportation Career Academy 2	Mathematics	2	Yes
English, Business Planning	Transportation Career Academy 2	English	7	Yes
CAD, Architectural Drafting	Transportation Career Academy 2	Architectural drafting	25	Yes
English, Literature	Medical magnet high school	English	11	No
Biology	Medical magnet high school	Life science	12	No
Magnet Coordinator	Math, science and technology magnet	Life science	10	No

students. Throughout the mini-sabbatical, teachers had specific homework assignments and kept a daily journal.

We recruited student participants through the counselors at the participating high school and through school-wide announcements.[5] Written parental consent was obtained for each student's participation. Fifty-one students (57 percent female), ages 13-18, were paid $20 per day to participate. Their ethnic background was 55 percent Latino, 10 percent African-American, 23 percent Asian, and 12 percent Anglo. Each teacher was assigned from six to seven students. Students also kept journals and completed activity logs daily.

The mini-sabbatical was held over six weeks, four days a week (Friday free), with six to eight hours of training each day. A brief outline of weekly activities follows (see syllabus in the appendix).

Week 1: Prepare for worksite observations

Week 2: Observe worksites

Week 3: Design curriculum

Week 4: Finish curriculum and plan assessment

Week 5: Teach curriculum

Week 6: Teach and assess curriculum, final presentation

Assessment Instruments and Methods

The pilot test design incorporated multiple assessment instruments and other sources of data to assess the mini-sabbatical's overall effectiveness and success in achieving each of the main goals outlined above (see Table 2).

Teachers were encouraged to write in their journals daily and were also given specific journal assignments (e.g., write a note to one of your colleagues back at school, explaining what makes a "Classroom that Works"). We collected journals on a weekly basis and wrote summaries of their content for each teacher. We paid particular attention to identifying points of change in knowledge and practice that teachers wrote about.

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[5]The high school housed one of the transportation career academies where three participating teachers worked.

Table 2

SOURCES OF DATA FOR ASSESSMENT

Sources	Teacher survey	Teacher journals	Teacher evaluation	Designs and curriculum	Student journals
Goal 1		X	X	X	
Goal 2	X	X	X	X	
Goal 3	X	X	X	X	
Goal 4		X	X	X	
Overall		X	X		X

Students wrote journals on each of seven days, in response to specific questions or prompts (e.g., what problems are you facing working in teams? What were some challenges you felt as a learner? Describe a problem that you solved today.) We wrote summaries of journals written by all the students in each class, by day and by teacher.

At the end of the mini-sabbatical, teachers completed an evaluation form. Teachers rated the usefulness of activities (e.g., journal writing, readings, briefings, etc.) associated with learning the "Classrooms that Work" model, worksite observation, curriculum design, and summer school on a scale of 1 (not at all helpful) to 5 (very helpful). Open-ended questions asked teachers to identify the most important way their practice changed and what critical moments or experiences contributed to this change. In addition, we asked what, in retrospect, might have helped teachers accomplish change more easily or make additional hoped-for changes. Finally, we asked teachers to anticipate the likelihood that they would incorporate changes into their day-to-day professional practice.

In addition to surveys, journals, written evaluations, curriculum, and assessment designs, we conducted a focus group with participating teachers in October 1996. Thus, we were able to find out the extent to which teachers had been able to incorporate lessons

learned in the mini-sabbatical to their regular teaching, and what barriers, if any, they perceived in changing their teaching practice.[6]

Evaluation Findings

Before reviewing findings related to each goal, we note that teacher ratings on the cumulative evaluation form were very positive overall: average rating ranged from 3.6 to 4.9 (33 items covering activities in four areas). One activity received a rating of "2" from one teacher; otherwise, all items were rated 3 or higher. Uniformly, teachers had very positive comments about the experience as a whole. When asked if they had any suggestions for improving the mini-sabbatical experience, one teacher wrote, "No! The professional development mini-sabbatical was very interesting, exciting, well prepared, interactive, and challenging!"

In the following sections we review the set of mini-sabbatical activities related to each goal, then discuss findings related to achieving each.

Goal 1: Increase Knowledge of Work Practice

For most teachers, the activities designed to increase their knowledge of the world of work, as related to their specific discipline, were very successful and meaningful. At the end of the first week, teachers were introduced to the skills they need to perform, analyze, and document worksite observations. Presentations by mini-sabbatical trainers addressed several topics: (1) authentic practice, work context, and the rationale for worksite observations; (2) understanding work from workers' perspectives; (3) techniques for observing and documenting work; (4) types of tasks suitable for the design of high-quality learning experiences; (5) logistics of workplace observation scheduled for week 2 (e.g., assigned mentor, schedule, etc.). Teachers had an opportunity to practice observation and documentation techniques by shadowing a RAND staff member. Work

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[6]We also videotaped each teacher several times during class time. The videotapes were viewed daily by the group of teachers to provide specific feedback and to generate discussion about the instructional methods, student engagement, and other topics determined by the teachers. Overall, seven teachers found this feedback very useful (rated 4 or 5 on the evaluation form). Although these tapes could be used to track changes in teaching in some detail, this was not our purpose.

observations included an electrician, a computer trouble-shooter and repairer, and a public relations officer.

Teachers spent the following week at assigned workplaces to observe work practice, take fieldnotes, and interview their mentor. We attempted to match teachers to worksites and mentors based on the teachers' disciplines, their school programs' industry focus, and the teachers' initial ideas about the curriculum unit that they were going to develop. During the observation phase, mini-sabbatical staff reviewed and commented on teachers' fieldnotes, to ensure that teachers were focusing their observations to capture information about work organization, workplace skills, and other aspects of worklife that could inform their curriculum development projects. Mini-sabbatical staff were also "on call" in case teachers had questions or encountered problems during their worksite visits.

Five teachers working in transportation career academies were assigned to various departments at the Los Angeles County Metropolitan Transit Authority (LACMTA), which is a business partner with the school district that houses these academies. Others conducted worksite observations at a local university and two public agencies (see Table 3).

Except for the transportation career academy English teacher, whose original mentor assignment did not work out as expected, the teachers learned a great deal from their worksite observation and interviews.[7] Teacher journals and fieldnotes highlight important themes, such as understanding the difference between domain-specific and generic skills and identifying authentic work problems that can animate the design of project-based work in the classroom. The following journal entries illustrate teacher experiences in their own words:

> I saw a brainstorming session in which each person, knowing what they bring to the table, created a powerful example of people working together to solve a problem—to get out a simple message, the uniqueness of the cancer center. ...If I can create curriculum with structures to allow students to bring to the table their experience and knowledge to work through a problem based on literature or media, I will feel great to transfer the creative chaos, with

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[7]The mentor at this site did not seem to understand the requirements of the observation. He wanted the teacher to do specific tasks for him rather than let the teacher observe work and workers in his department.

> reason never far behind, to the classroom (teacher 6, medical center marketing department).
>
> After having observed for two days, I finally am beginning to feel like I can do this. I am learning a lot of additional information about laboratory procedures. I see how the plant works. This is a rich source for planning biology labs (teacher 7, standards and testing laboratory).
>
> Some of the generic skills that I think would be transferable to the curriculum I'm writing ...(1) how to *communicate* effectively in a small group setting and make so that everyone has a job to do according to the level of expertise; (2) how can the project be *managed* effectively so that a complete product is the endpoint; (3) how can *motivational* techniques be utilized to keep student on task over a large period of time? (4) what kind of *goal setting* techniques can be utilized? (teacher 5, DWP executive offices).

During debriefing and discussion sessions, the teachers shared observations about their worksites and implications for their curriculum and teaching. After even two days of observation, several important themes emerged from their discussion which suggest that teachers were learning valuable lessons and new information about work practices. Several teachers, for example, discussed the importance of interpersonal relations at work, and the need to work with different types of people to build consensus. They noted differences in types of workplace communications (e.g., informal hallway conversations versus formal meeting for sharing information) and the importance of having good communication skills. They also discussed teamwork and interdependencies among jobs and departments, particularly for projects or tasks that require different types of expertise (e.g., subway station design and construction, multimedia presentations). Differences in management styles were noted, particularly ways to motivate staff and organize projects. One teacher, for example, considered how techniques used to motivate staff in the workplace might be applied to motivating students in the classroom. In discussing their individual worksites, teachers agreed that workplaces are not always "easy places."

From these and other insights gained during their worksite observations, they began to identify skills and knowledge to incorporate into their curriculum plans. In addition, they also began to think differently about the workplace learning experiences that their school programs provided for students. Several teachers admitted that they had never thought much about these work placements because they were organized by a program coordinator. Their own experiences prompted new considerations: Are we doing a good enough job of preparing students to enter a real work environment? Should we give students specific tasks to accomplish at their work-based learning sites?

Table 3

WORKSITE OBSERVATION ASSIGNMENTS

Discipline	Location	Assignment
1. Math/Technology	LACMTA, Construction Management	Design engineer working on tunnel design/inspection
2. CAD/Technology	LACMTA, Facilities Engineering	CAD operators involved in design project with engineering emphasis
3. Math/Computers	LACMTA, Engineering	Civil engineer working on a project at conceptual/design stage with architects
4. CAD/Technology	LACMTA, Countywide Administration	Project manager using GIS applications on an architectural project
5. English	LACMTA, Contract Administration	Contract administrator responsible for briefing media on major project
6. English	Medical Center, marketing department	Communications specialist working on multi-media presentations
7. Science	LA General Services, Standards and Testing Laboratory	Scientists working in field and laboratory settings
8. Teacher Trainer	Department of Water and Power (DWP), Executive Offices	Administrator involved with everyday operations requiring multi-task problem solving

Interestingly, even teachers with previous related work experience found the fieldwork valuable. For example, one teacher with experience working as an architectural draftsman reported that his critical moment or experience in the mini-sabbatical was related to what he learned in the workplace: "Using problems from MTA, as opposed to standard educational texts, creates the classroom into an office."

Goal 2: Develop High-Quality Integrated Curricula

Throughout their worksite observations, teachers began the process of thinking about how to incorporate aspects of work practice into their curriculum plans. Curriculum development activities (weeks 3 and 4) first included an exercise to help teachers move from worksite observation to instructional design—that is, from job tasks to authentic problems. Mini-sabbatical trainers led a discussion about authentic practice, then asked teachers to discuss and write examples from their own job study. Their summary addressed several dimensions, including skills, tasks, and work context for the job; authentic problems; categories and examples of instructional goals that address authentic problems; and aspects of a hypothetical classroom environment. Teachers read and discussed alternative approaches to developing integrated curricula, and reviewed the "Classrooms that Work" model. Teachers were asked to build their new curricula around a project or investigation that follows the principles of authentic practice and solving authentic problems. We provided an instructional design "template" for teachers to specify several elements of their design: summary of student product; instructional goals (generic, domain, attitudes or dispositions); design (e.g., culture of practice, teacher role, assessment, classroom set-up); teaching methods; resources required; organizational supports (e.g., coaching by mini-sabbatical trainers or peers, preparation time. In subsequent sessions, teachers had opportunities to modify this "baseline" design and provide a rationale for any changes they made.

One way to assess teachers' progress in curriculum development is to compare the types of lessons and units they initially proposed, prior to being selected as mini-sabbatical participants, with the projects and topics they began to refine during week three. On the pre-course survey, we asked teachers to submit a previously taught curriculum unit that they planned to refine during the mini-sabbatical. If they did not have a particular unit in mind, but planned to create a new unit for an existing course, we asked for the course summary or syllabus. As a third alternative, teachers could submit a curriculum unit that they believed motivated students' effort. Teachers also answered a

series of detailed questions about the curriculum. This comparison reveals some significant changes (see Table 4).

One clear difference is the emphasis on group work over individual learning assignments. Six teachers began with individual student projects or assignments, but all designed team-based projects for their final curriculum.

Although some teachers initially proposed projects, their final projects were much more "authentic" in their connection to real work settings. A CAD/drafting teacher, for example, proposed to develop a project that he already conducted in his class—to build a popsicle bridge as a way to illustrate principles in drafting, math, and science. The requirements for the bridge project came from a contest held by the local chapter of the American Society of Engineers, where schools could actually send teams of students to a bridge-building competition. For this teacher's final project, students designed a bus parking lot on a real site, given a set of specifications drawn from actual design requirements by a county facilities engineering department (where he had done his work observation). Students worked in teams as design engineers or architectural drafters and produced an actual plan. This project supported many of the same skills as the popsicle stick bridge (e.g., drafting, math, problem solving) but also incorporated other work-related, generic skills (teamwork, communication and presentation) and technical skills (understanding spatial relationships, two-dimensional area planning). In addition, their final product is not a toy model, but an actual plan of the type that working engineers and architects produce.

As the previous example also illustrates, another significant change is the integration of academic skills, generic skills, and specific competencies needed to carry out a project. Although their initial projects were often interdisciplinary or explicitly connected to other classes in the school program (e.g., the English teacher's assignment for students to write reports about work conducted in their technology class), they did not typically emphasize or articulate work-related skills. When teachers came to the project, curriculum integration typically meant "interdisciplinary." By the end of the mini-sabbatical, however, they learned to incorporate other aspects of integration into their lesson planning and instructional goals, namely the connection between school and work.

Table 4

INITIAL AND FINAL CURRICULUM TOPICS

Discipline	Initial	Final
Mathematics (transportation)	Mathematical problem-solving unit on understanding distance/ time problems	Design and build a model jack for underground tunneling
CAD/Technology (transportation)	Design and build a popsicle stick bridge	Design a bus parking lot on a particular site plan, in accordance with certain specifications
Math/Technology (transportation)	Math curriculum unit to investigate inscribed angles in circles	Design and build a monument bridge, including financial and architectural plans, and community research
English (transportation)	Plan, organize, orally present, and write a report about projects done in technology class	Produce a formal presentation of a feasibility study on a community through which a new subway line will pass
CAD/Technology (transportation)	Team projects to research and design a facility, with functional requirements provided, and produce a written presentation	Create a foot traffic model that will predict student traffic patterns and recommend needed changes to school administration

English (medical)	Introduction to literature: unit, What is Poetry?	Create a multi-media advertising and marketing campaign for teen health-related product
Science (medical)	Curriculum unit on scientific methods of problem solving—example on denaturation of proteins	Develop a report on water samples from various sources; design public service info sheet
Teacher Trainer (science and technology)	Cooperative group activity, "The Hunger Project," where students research solutions to solving world hunger	Develop a plan for NASA on managing the colonization of the moon

Teachers were also very inventive in defining their roles and in creating a culture of practice in the classroom. The biology teacher, for example, became a laboratory supervisor (who occasionally adopted the role of lab assistant) to her students—the "testing laboratory" scientists. On the first day of class, she handed out a memo to the "scientists" at the "Wilson County General Services Division, Testing Laboratory" that outlined training they would receive in the lab and what their work duties would entail. The teacher/lab supervisor wore a white lab coat and fitted the classroom with test tubes, thermometers, chemicals, and other materials needed for water testing.

Goal 3: Learn and Apply the "Classrooms that Work" Model

Teachers were introduced to the CTW model during the first week of the mini-sabbatical through a set of briefings, readings, and journal writing exercises. Concepts were reinforced in week 3, when teachers began to develop their curriculum. Teachers had opportunities to practice new teaching methods during weeks 5 and 6, when they taught their curriculum units. Teachers received coaching from mini-sabbatical staff and through videotape feedback and group discussion.

Teacher evaluations indicate that the curriculum materials and processes were very useful for developing teachers' understanding of the CTW model. Six teachers'

journal entries during the first week emphasized developing teaching goals, re-defining teacher and student roles, thinking of students as responsible learners and problems solvers, and working collaboratively with other teachers on curriculum and practice issues. One teacher remarked: "I'm beginning to realize that after taking time to meditate on what makes 'classrooms that work' that I have much to learn."

Overall, while teachers were generally familiar with the concepts of constructivism, student-centered learning, cooperative learning, and the like, they had not been introduced to a comprehensive model that outlined specific teaching practices or design principles for implementing such concepts. As teachers reflected on the CTW model and what implementation of CTW concepts actually means for their practice, they began to develop useful insights. In week 4, just before teachers went into the classroom, an experienced teacher wrote:

> Last night I read "A Tale of Two Classrooms" and realized that experience as a teacher does not necessarily mean an effective teacher. ...I am challenged to ask what skills should I be teaching? What is the classroom design? What teaching technique will I use?

The CTW model presents several specific techniques that teachers should adopt to enhance student-centered learning, such as coaching, scaffolding, and fading. Adopting these techniques requires fairly significant changes on the part of teachers because they must give more responsibility to students for their own learning and not always take center stage. While teachers supported such pedagogical techniques in principle, they found it much harder to put them into practice. Some indicated that changing this aspect of their teaching practice was the most difficult and challenging part of the mini-sabbatical. In particular, teachers struggled with relinquishing control and "power" and trusting the student groups to succeed with little intervention on their part. Teachers wrote about and openly discussed problems associated with giving up control and power.

> Very difficult for me to relinquish control. I feel that I need to be at every phase of the project, making sure that they are doing it right (teacher 5, week 5).

> I have felt strained over the changes necessary to becoming more conscious of my teacher role in becoming a "coach" and letting go of my centered ego (teacher 6, week 5)

> My teaching style of old is still in evidence. I think it stems from my reluctance to let them or trust them to explore on their own. I need to find my niche in the class in order to fulfill my role as a facilitator. It's an issue of control (teacher 8, week 5).

> I must think and rethink my role as a teacher because I like being the person that all the students run to for all of the answers. I have a hard time backing off, and just letting the students learn on their own (teacher 2, week 5).
>
> Old habits are hard to break and it's *very* hard for me to turn over the control of the class over to the class. But, I also understand that if I want them to be responsible for their own learning, I have to turn over that responsibility (teacher 8, week 5).

Teachers also mentioned their successes in changing practice, despite the difficulties they initially experienced. For example:

> Today I felt more comfortable in the classroom. I trusted the class to complete the work. They did not disappoint me (teacher 4, week 5).
>
> I'm pleased that the process is working! I felt somewhat insecure, because they didn't "NEED" me (teacher 4, week 5).
>
> I started to have them do all of the work in the classroom and I would transfer their work to the computer at home and return with the finished product. However, I decided that they would benefit more from doing the entire project themselves (teacher 7, week 6).
>
> As a teacher who loves to be very involved in the process, it was very difficult for me not to lead the discussion; but I stepped away and behind the group (teacher 8, week 6).
>
> I am continuing to keep a low profile and am encouraging them to take responsibility for their work. I think it has a motivating factor, because they can take *ownership* of the project and not feel that they are doing something for the teacher (teacher 3, week 5).

Teacher journals also illustrate the opportunistic aspects of teaching, where classroom events present a situation that a good teacher can use to advance is or her instructional goals (Stasz et al., 1990). One English teacher, for example, reported an incident where a student objected to her starting the class five minutes ahead of schedule because students were only being paid for a certain amount of time. She used this objection to talk about workplace attitudes:

> I explained that I was aware of the time, but I needed to bring a few things to the attention of the group before I forgot. ...I took a few moments to explain again about the importance of the employee's attitude and work ethic. I cited the example of a manager seeking to promote someone to a new position. The attitude of the worker comes into play when a manager must justify a decision to promote one employee over another. Other students in the class immediately began to shake their heads affirmatively to signal their agreement with me. ...Then I moved the discussion to the business at hand (teacher 4).

Goal 4: Develop Alternative Assessments

Of all the mini-sabbatical goals, this one perhaps proved most challenging for teachers. During the class sessions staff held on alternative assessments, teachers heard a presentation and discussed a variety of topics, including reliability, validity, and feasibility. They also worked on some exercises which aimed to clarify these and other assessment-related issues. Even experienced teachers had difficulties thinking about how to assess students' performance in ways that aligned with all of their instructional goals.

> This week has been very informative for me. I have had the opportunity to actually find out what assessment is. The presentation that I received went into extreme detail, which really helped. However, I did not have any experience in assessing popsicle stick bridges or jacks. Assessment will be a challenge when determining the preferred outcomes from students (teacher 1).

> The assessment piece will probably be the most challenging. The documents and readings on assessment were quite helpful—but I guess I need some "hand holding" through this because my usual assessment practices include tests that measure *nothing* about learning (teacher 8).

As the following quotations suggest, teachers did gain some insights and understanding about assessments during the mini-sabbatical.

> I will need to provide the assessment criteria to my students so they know what to do and I know how to grade (teacher 3).

> A deeper realization is to connect closer my assessment criteria the work students are actually doing. Tied to this is the idea that students need more precision—as to my expectations and the reasons for my assessment criteria and curriculum goals—make my thinking plain and vocal. Let them see and hear how I think about thinking (teacher 6).

Some issues proved problematic for most of the teachers. The group had a very lengthy discussion, for example, on how to assess the quality of students' designs, as several projects included a design element (e.g., monument bridge, parking lot plan). What criteria should be used to assess the designs, and how should criteria be presented to students? The following journal excerpt discusses this issue as one of developing scoring "rubrics," and the trade-off between validity (measuring what the students are taught) and feasibility (teachers' time is limited):

> My problem with designing a rubric is that I want it to be fair to the learning of the students, yet I don't want it to have to take forever to make. If it does, I don't know how to convince my staff to do it regularly (teacher 8).

Teachers also discussed whether to assign individual or team grades, and what criteria to use for team assessment. They also discussed the constraints of assigning team or project grades, since each student must have an individual grade in a class. Since these were experimental classes, in which grades had little meaning, teachers did not actually assign grades to their students. The discussion about assessment was still important, however, because teachers will need to grapple with these issues when they implement their curriculum units in their actual classrooms.

In the final analysis, the mini-sabbatical was successful in getting teachers to think explicitly about assessments, but they did not really develop formal assessment procedures. However, teacher journals indicate that teachers constantly evaluated the learning process as students worked on their projects. This assessment was not formal, or explicit, in the sense that teachers decided a priori to track particular student behaviors or look for certain signs of progress. Rather, they seemed to monitor what students were doing, and then recorded what they saw and heard. In addition, they recorded their responses to student work, such as the type of feedback they provided or the suggestions they advanced to assist the groups. Thus, even though teachers did not always think formally about assessment, nor consider technical aspects such as validity or reliability, they nonetheless track student progress and assess student performance.

CONCLUSIONS AND LESSONS LEARNED

Our assessment suggests that the mini-sabbatical met with some success in achieving the goals we set out. However, we note some possible improvements to the mini-sabbatical curriculum and some observations about the process that might inform future staff development efforts.

Teachers Need More Assistance in Developing Assessments

Overall, the mini-sabbatical appears successful in helping teachers attain the first three goals, but somewhat less successful with the last. Teachers did not fully develop assessments to accompany their curriculum. This is partly due to the situation—teachers taught an experimental class where students were paid for their participation. Students were not working for grades, and teachers were not required to turn them in. In addition, the curriculum templates that teachers completed to record their curriculum design did not explicitly ask about assessment plans. This could be remedied in the future by simply modifying the form.

In addition, we found that most of the teachers were unfamiliar with the concepts and approach toward developing assessments presented in the mini-sabbatical curriculum. Only one teacher reported that the lessons on assessment were straightforward and "obvious." He did not understand why the other teachers' felt challenged by the material. As a result of limitations in teachers' knowledge about assessment design, the staff did not press teachers to complete assessments. Rather, it seemed more pressing to pay attention to other aspects of their curriculum and teaching.

Future implementations of the mini-sabbatical can be modified to accommodate teachers' level of expertise or comfort with their assessment development skills. The schedule could be modified by extending class time to permit more time for discussion and practice, and, as discussed above, to explicitly require teachers to develop assessments for their particular curricular units.

Teachers had Difficulty Relinquishing Control Over Learning

During the mini-sabbatical, our observations and teachers' discussions and journals indicate that giving up control of the classroom processes was a significant challenge for most of the teachers. The CTW model instructs teachers to adopt teaching techniques that place more responsibility for learning on students. The teachers' role is to provide coaching or scaffolding to assist students as needed to enable them to make progress, but then to "fade"—to let the students proceed on their own. The teacher's primary role is a guide or coach, not a source of the answers. This shift in behavior requires teachers to trust that students can do the work and to permit them to proceed on their own, and also to sometimes fail.

Teachers initially expressed their conflict as resulting from doubts about the students' abilities or their level of preparation. The teachers were unsure about when to appropriately intervene and when to stay out of the way. The group had many discussions about when to "fade" and when to intervene, as the following excerpts from their journals illustrate:

> I'm convinced that the lecture-discussion doesn't cut it. Allowing students "freedom to explore" also has problems in that some kids need structure—it's finding the balance that will be the challenge (teacher 8).
>
> One group was working well and the other "shy" group remained apart from each other. I returned later and the students [in the shy group] were silent. I felt frustrated. But I tried to let them be. On the other hand, the other three

were already designing a magazine ad. They were working independently but stopping and sharing their work with each other (teacher 6).

As time went on, teachers explicitly discussed this issue as a matter of giving up power and control. And many continued to struggle throughout their teaching. Teachers were also often pleasantly surprised when students could do the work on their own. This suggests that having high expectations for students may be an important ingredient for teachers to feel comfortable relinquishing control.

> As we approached the meeting deadline to decide who the presenter [for the final presentation of the class project to the other classes] will be, I was anxious. As we sat down to discuss, I began to feel that the group was wanting to continue. ...They were annoyed to be interrupted by a planning meeting. They had great confidence in the person they announced to me that they had already chosen. The decision was made long ago. I was the last to know! (teacher 4).

The conflict over degree and type of teacher control over the learning process can be interpreted as the tension between andragogy and pedagogy. In many respects, the CTW model reflects principles of adult learning, primarily in it's emphasis on project-based curriculum that mirrors problems or situations found in real-life and the expectation that learners can be self-directed and responsible. In the mini-sabbatical, teachers must learn to navigate the continuum between their traditional pedagogy and andragogy and to adapt their teaching as needed.

Teacher Collaboration is an Important Catalyst for Learning

An important design aspect of the mini-sabbatical was to establish a learning community by having teachers work as a collaborative group and use each other as resources, critics, inspiration, and so on, as they developed their curriculum. Teachers typically have little time for collaboration and are used to working in isolation.[8] Following the adult learning model, we knew that teachers brought relevant experiences to the mini-sabbatical that were vital to their personal success, and we needed to find

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[8]One teacher wrote about this in his journal because he at first felt annoyed at having to participate in a group presentation rather than finish his work on his own: "But I think I've developed this from my education environment. As a teacher I am accusotomed to working solo—this is not to say that cooperative work is less desirable, but each person here has his/her own theme."

ways to reveal this expertise to enhance learning for all. By having teachers establish their own "community of practice," we hoped to provide a model for collaboration that they could take back to their home schools and, ideally, establish as part of their everyday practice. In addition, their own group work and interaction might give them insights about how to design and support collaborative work for their students.

In many respects the group of participating teachers became a collaborative team. In many group situations, teachers openly shared ideas, concerns, and even self-doubts. Teachers formed smaller groups and had long discussions and debates. Teachers from the same school discussed strategies for continuing to work together during the school year and for disseminating lessons from the mini-sabbatical to the remaining teaching staff and school administration. Teachers also got involved in each others' projects, for example, by role-playing a "client" for the advertising campaign or a representative from city government who reviewed the monument bridge.

Support the Reflective Practitioner

The mini-sabbatical also supported teachers' reflection on their own learning and practice. We asked teachers to write journals on a regular basis, sometimes following specific prompts. Journal writing appeared to aid reflection and learning processes for some teachers, but not others. Some teachers wrote extensively, on a regular basis, while others appeared to write because they were given the assignment. As discussed earlier, journal writing was a particularly useful tool for recording the classroom activities and students' responses to the curriculum.

The mini-sabbatical curriculum also introduced teachers to the concept of action research (Bullough and Gitlin, 1995). Specifically, action research was presented as a way for teachers to examine their own practice during the teaching phase of the mini-sabbatical. We asked teacher to identify a concern or issue related to some aspect of their teaching (e.g., inability to give up control to students), to gather data about it (e.g., through videotaped replay of classes, student behavior, discussion with mini-sabbatical staff and peers), to reconsider the initial concern in light of the data, and possibly reformulate it, and develop a strategy for future practice. Most teachers' daily journals during the teaching phase of the mini-sabbatical indicate use of the action research principles. Some teachers, however, showed little sign that the action research approach appealed to them as a strategy for systematically understanding and monitoring their own

practice. We conclude that the group collaboration was most valuable for promoting reflective practice, since it did not depend on teachers also taking the time to write in their journals. The value of collaboration through shared-planning time or other means has been corroborated in many other studies of teaching.

Industry Experience is Not Sufficient for Developing Work-Related Curricula

Research on approaches for integrating academic and vocational education often suggest that academic and vocational teachers should collaborate because each brings different expertise to the curriculum development process—the academic teacher bring subject-matter expertise, while the vocational teacher contributes work-related knowledge and experience. Although this characterization is undoubtedly true at some level, it does not necessarily mean that vocational or academic teachers' past experience prepares them to create project-based curriculum that reflects authentic work practice. Even teachers with relevant work experience may need assistance in translating that experience to first identify authentic problems and then to transform those problems into a curriculum that meets a complex set of learning goals for students.

The workplace observation phase of the mini-sabbatical proved very successful in helping even experienced teachers think about the workplace as a source of information for designing curriculum projects that both engaged students and taught domain knowledge. Our method was to train teachers as observers, just as if they were conducting research about work. At the worksite, teachers identified a job for study that was related to their proposed curriculum unit, then focused their attention on defining the social setting for the work and the frequent and critical tasks assigned to the job. They took fieldnotes, which mini-sabbatical staff read and provided feedback on, then used their fieldnotes and group discussions about work observations as input to curriculum design. This approach enabled teachers to learn about the social nature of work—for example, whether projects are carried out by groups or individuals, how teams are comprised and managed, how supervisors motivate staff—as well as the knowledge and skills that individuals need to carry out a particular job. Understanding the social aspect of work is important for classroom design under the CTW model, because it helps reveal problems and projects that can be simulated in the classroom.

Teaching is Not Always Planned

Traditional pedagogy, following an instructional design model, emphasizes efficient teaching, where teachers goals lead to well-structured lessons that clearly transmit skills and knowledge. Studies of teaching from a traditional and constructivist perspective reveals that teachers' planning, instructional activities, and teaching techniques are organized around their instructional goals. However well-planned, teaching is also a dynamic and fluid activity, and teachers must often improvise (Stasz, et al., 1993; McArthur, Stasz, and Zmuidzinas, 1990). Thus, models of teaching should be useful for guiding both planned and unplanned aspects of practice.

The CTW approach begins with defining instructional goals, which in turn become a focal point for classroom design. Good teachers can identify opportunities that spontaneously arise in the classroom for advancing their instructional goals (Stasz et al., 1993). As described earlier, teacher 4 used a student's complaint about starting the class five minutes early to talk about the importance of work attitudes for success on the job. And one teacher noted:

> I have made a conscious decision to not always have planned lectures, but to let them come naturally from questions found from researching the material (teacher 8).

Although we had developed the CTW model from previous research on teaching generic skills in academic and vocational classrooms (Stasz et al., 1990; 1993), the mini-sabbatical was our first attempt to teach and reinforce this approach throughout curriculum design and practice teaching activities. Our observations and teachers' feedback indicate that the CTW model can help structure teachers' planning and curriculum design activities, but also help prepare teachers to make use of opportunistic moments for advancing their instructional goals.

Afterword: Implications for Designing Staff Development

In October 1996, we met with participating teachers to discuss the extent to which they were able to take lessons from the mini-sabbatical into their regular teaching. We were very encouraged by reports of six teachers who attended this meeting. Two teachers in the medical magnet school had become more involved in the work-based learning part of that program. One teacher taught his students how to be observers in the workplace and provided some structure the daily journals that they kept. Previously, students wrote

journals, but these were not used in any systematic way to help them reflect on their work experiences. The other teacher changed several aspects of her teaching. For example, she decided to let the students work in groups to develop criteria for their own laboratory assignments in science class. In some respects, the students' criteria were more challenging than her own had been, yet the students seemed most willing to meet high standards that they had set for themselves. Three teachers at one of the transportation career academies reported working more closely than they had in the past. All teachers reported that they incorporated the curriculum unit developed during the mini-sabbatical into their regular courses.

The only teacher trainer in the group, in her role as coordinator of a new math, science and technology magnet school, was still hopeful about incorporating some aspects of the mini-sabbatical into her teacher training activities. She had not yet had the opportunity to so because of other pressing business related to developing and expanding a new school. Her intent, however, was to train her teachers as soon as possible.

The mini-sabbatical began with a premise about what teachers needed to know in order to teach in school-to-career programs—knowledge about constructivist teaching, knowledge about work, and knowledge about designing classrooms and assessing students. It also began with the premise that any staff development process for teachers should adopt an adult teaching model, including such features as opportunity for reflection, collaboration, and practice (the teaching phase). Our pilot test indicates that the mini-sabbatical content and process, with some small modifications noted earlier, is an effective approach for changing teaching practice. We believe that our approach is a useful starting point for developing both inservice and preservice programs for teachers, particularly those involved in school-to-career programs.

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APPENDIX
MINI-SABBATICAL SYLLABUS AND READING LIST

SYLLABUS

This syllabus summarizes the scheduled activities of the mini-sabbatical. It is organized by day, i.e., by class meeting, and assumes a four-day week and six to eight hours of training time each day. The syllabus indicates the day's chief topic or activity, what you should read to prepare for class, and what you will do during class. The list of required readings is found after the description of daily activities. If an assignment is due (for instance, if journals will be collected) on a given day, that is indicated ***in bold italic.***

Week 1: Prepare for Worksite Observations

Monday - Activities 1.0-1.5

Read:
- Collins et al., "Cognitive Apprenticeship: Making Thinking Visible"
- *Classrooms That Work*, Summary and Chapters 3-6

Journal: Fifteen minutes on topic

Tuesday - Activities 1.6-1.9

Read:
- Collins and Frederickson

Journal: In response to provided prompts

Wednesday - Activity 1.9, continued

Journal: In response to discussion questions about in-class presentation

Due: ***Practice fieldnotes***

Due: ***Journal entries from Week 1***

Week 2: Observe Worksites (worksite locations to be arranged by mini-sabbatical staff)

Monday - Activity 2.1, Offsite Fieldwork

Journal

Tuesday - Activity 2.1, Offsite Fieldwork

Journal

Make fieldnotes

Wednesday

Journal

Summarize fieldnotes

Thursday - Activity 2.1, Offsite Fieldwork

Journal

Make fieldnotes, conduct interviews

Friday - Activity 2.1 (conclusion), Activity 3.1

Journal

Write: Begin summary of authentic practice

Due: ***Journal entries from Week 2***

Week 3: Design Curriculum

Monday - Activities 3.1-3.3

Read: • *Getting to Work: Module 2, A Day in the Life of a Tour Manager for Handicapped People, Sections 1, 3, 4, 6, 8, 16*

Write: Finish summary of authentic practice

Journal

Due: Copy of fieldnotes from Week 2

Tuesday - Activities 3.4-3.5

Read: • *Getting to Work: Module 4, A Practical Guide to Alternative Assessment*

Journal

Due: ***Summary of authentic practice***

Wednesday - Activity 3.5

Journal

Due: ***Explanation of curricular approach***

Thursday - Activities 3.5-3.6

Journal

Due: ***Draft curriculum design and assessment plan (presentation to peers and faculty)***

Week 4: Finish Curriculum and Plan Assessment

Monday - Activities 3.5, 4.1

Journal

Read: • Bullough and Gitlin

Tuesday - Activities 3.5, 4.2

Journal

Wednesday - Activity 3.5, continued (move to classroom site)

Journal

Thursday - Activities 3.5, 4.3

Journal

Due: ***Curriculum design presentation***

Week 5: Teach Curriculum

Monday - Activities 5.1-5.6

Revision Log

Journal

Tuesday - Activities 5.1-5.6, continued

Revision Log

Journal

Wednesday - Activity 5.1-5.6, continued

Revision Log

Journal

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Thursday - Activities 5.1-5.6, continued

Revision Log

Journal

Due: ***Journal entries for Week 5***

Week 6: Teach and Assess Curriculum

Monday - Activities 5.1-5.6, continued

Revision Log

Journal

Tuesday - Activities 5.1-5.6, continued

Revision Log

Journal

Wednesday - Activity 5.1-5.6, continued

Revision Log

Journal

Thursday - Activities 5.1-5.6, continued

Journal

Videotape

Due: ***Final presentation of curriculum design and assessment (to peers and faculty)***

Due: ***Journal entries for Week 6***

Due: ***Revision logs for Week 6***

READING LIST

"A Day in the Life of a Tour Manager for Handicapped People," (1989). Excerpt from David W. Howell, *Passport: An Introduction to the Travel and Tourism Industry.* Cincinnati, OH: South-Western Publishing Company.

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